D1 Servo Drive
TAIWAN EXCELLENCE
GOLD AWARD '12 '11 '08 '05 '02 '00 '99

Ballscrews
- Ground/Rolled
  - High Speed
    - High Design
    - Super S Series
  - Heavy Load
    - Type II
    - NSK

Linear Actuator
- LAN for Hospital
- LAM for Industrial
- LAK Controller

AC Servo Motor
AC Servo Motor Drives

TAIWAN EXCELLENCE
SILVER AWARD 2008

Linear Guide
- EG Series
- High Performance
- Low Noise (Q1)
- Air Jet (A1)

Linear Motor
- High Precision
- Multifunctional Integration
- Ecology First
- Humanistic Technology
Excellent Performance

The D1 drive attains high positioning performance to compliment the motion control technology of the semiconductor industry. The D1 drive achieves very good following characteristics and effectively shortens the positioning time.

Simple Operation

Human-machine interface provides very simple settings. All standard types of motors and encoders are built inside. Setup can be completed with just one-click.

Complete Tool Sets

There are commissioning interfaces for speed and acceleration protection settings, gain settings, and an I/O test. Plus the D1 drive has a complete filter, frequency analysis, Bode plot, Lissajous figures and other functions which provide a complete driver control program.

Easy Integration

HIWIN provides positioning modules, motors, and the best servo drive solution from mega-fabs. According to customer’s requirements we can integrate all that are required for user’s easiness of application.

Services

Through HIWIN’s complete global presence, we can provide immediate technical services at any time.
With help of semiconductor high-end motion control algorithm and advanced common gain concept, the high speed response is achieved, therefore satisfying all of the motion control needs.

The D1 drive offers many flexible features, such as an electronic gear function which helps the user to adjust the resolution of the host controller’s command pulse. This solves compatibility problems between the encoder’s resolution and the host controller. The D1 drive can also set the resolution of the emulated encoder which is the output to the host controller. This also solves the compatibility problems between the encoder’s and the host controller’s resolution.

Using advanced WizAlg controller design tools, plus space vector current control technology, servo performance has been achieved to the highest level. To change motor speed from -3000 to +3000 rpm, it takes as low as 0.006 second.
**Built-in accuracy improvement features**

D1 drive includes features to improve total positioning accuracy of the mechanical system. The table size can be up to 16000 points. It is implemented in all control modes to optimize system behavior.

**Vibration Suppression Feature**

D1 drive can remove the vibration frequency that occurs during movement. It reduces vibrations caused by system’s structure and improve the machine’s production efficiency.
Simple Operation

Simple setup

Three Steps

Easy operation

Parameters are categorized according to features, only necessary ones are shown at the right time. No confusing parameter list.

LCD display

Without PC and user’s interface, it is possible to complete basic settings. The LCD display shows the necessary error or warning information and statuses. With push buttons on the panel, it is possible to set gains and test run.
Wide range of tools

Accuracy enhancement

To improve on the positioning accuracy of motion systems, the D1 amplifier is featured with an error compensation function. By taking the measurements from a laser interferometer, the positioning error table can be built inside the D1, so that high positioning accuracy is achieved.

Advanced gain scheduling feature

After setting gains through optimization tools, there is only one value to adjust: the common gain. During motion, the D2 drive provides a gain scheduling function. You can adjust the gain according to different phases of motion, such as moving phase, settling phase, and in-position phase.

Optimization tools

The D1 provides a powerful and easy to use tool for optimization. You can use the frequency analysis tools to display the real response in the form of a graph. You can easily set the best gain value for the system based on the real response, even first time users can easily get started.

Variety of I/O functions

In response to a number of different functions, you are free to configure the I/O pin functionality and adapt different hardware interface needs. This satisfies diverse requirements for different motion controllers with regards to their pin assignments and hardware interfaces.

Analysis Tools

To solve a resonance problem, the D1 drive offers a filter design tool for improving the control performance, a Fast Fourier Transform (FFT) and other mathematical operation tools. You can use the functions to calculate the resonant frequency of the system easily, and to make the filter design more accurate.
Easy Integration

The total solution

LMC  LMS  LMT  TMS/TMX

Linear Motor Stages

Mega-Fabs Drive

D1 Applications

- PCB Inspection Machine
- Wafer Inspection Machine
- Laser machining
- Industrial robots
- Precision machining equipment
- Large and small size flat panel inspection equipment
- Warehouse positioning system
- Industrial control applications
- Optical Inspection Machine
- Robot control
## Motor models and the corresponding drive models

<table>
<thead>
<tr>
<th>Motor series</th>
<th>drive</th>
<th>Motor series</th>
<th>drive</th>
<th>Motor series</th>
<th>drive</th>
<th>Motor series</th>
<th>drive</th>
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<tbody>
<tr>
<td>LMS47</td>
<td>LMS13~LMS27</td>
<td>LMS13~LMS27</td>
<td>TMS03~TMS07</td>
<td>TMS03~TMS07</td>
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<td>LMSC7</td>
<td>LMS37~LMS37L</td>
<td>TMS12~TMS18</td>
<td>TMS48</td>
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<td>LMCA2~LMCA6</td>
<td>LMS57</td>
<td>TMS32~TMS38</td>
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<td>LMCB2~LMCB8</td>
<td>LMS67</td>
<td>TMS3C</td>
<td>D1-36-T</td>
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<td>MD-36-SR</td>
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<td>LMCBA</td>
<td>LMSC7(WC)2</td>
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<td>LMCC7~LMCC8</td>
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<td>LMCD4~LMCD8</td>
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<td>LMCE4~LMCEC</td>
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<td>LMCF4</td>
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<td>LMF01</td>
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<tr>
<td>LMTB2~LMTB4</td>
<td>LMF01</td>
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<tr>
<td>LMTC2~LMTC4</td>
<td>LMF03</td>
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<tr>
<td>LMTD2~LMTD4</td>
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Wiring example

- Display Panel
  Two lines Dot Matrix Indicates messages and parameters

- Status LED
  Ready/ Error quick guide

- Connection to PC
  Use Rs-232 cable
  Please download from -www.hiwinmikro.com.tw-

- Connection to host controller
  26 pin SCSI connector
  (Standard accessory)

- Connection to Encoder
  Encoder cable (optional)

- Circuit Breaker (MCCB)
- Noise Filter (optional)
- Magnetic Contactor (MC)
- Reactor (optional)
- Regeneration (optional)
- Reactor (L) (optional)
- DC 24V for brake (applied by Customer)
- MOTOR power end

- DC 24V

- Lightening For D1 FREE
  Reactor (L) (optional)

- +24V
Drives for Linear Motor Stages

- Digital amplifier
- Field oriented control
- Intuitive Lightening interface
- 100-240VAC input power
- Supports Step/Direction, CW/CCW and A/B phase pulse format
- Supports +/- 10V voltage command
- Supports analog and digital encoder

![Diagram of drives for linear motor stages](image)

1. Motor Cable
2. Encoder Cable
3. RS-232 Cable
4. Regen Resistor
5. Controller Pulse Cable
6. Limit Switch Cable
Wiring example

* Axis 0 is shown in this example
** In case of user's PLC or motion controller, the pin numbers would be different.
Drives for Rotary Tables

- Digital amplifier
- Field oriented control
- Intuitive Lightening interface
- 100-240VAC input power
- Supports Step/Direction, CW/CCW and A/B phase pulse format
- Supports +/- 10V voltage command
- Supports analog and digital encoder

① Motor Cable
② Encoder Cable
③ RS-232 Cable
④ Regen Resistor
⑤ Controller Pulse Cable
## D1 Drive Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Communication cable</td>
<td></td>
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<tr>
<td>RS232 communication cable</td>
<td>LMACR21D</td>
<td>2m long, RJ11 connector at driver end</td>
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<tr>
<td>Connector Kit</td>
<td></td>
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<tr>
<td>Connector Kit (without CN3 connector)</td>
<td>D1-CK1</td>
<td>Incl. connectors for CN2, regenerative resistor, 24V control power and AC power</td>
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<tr>
<td>Connector Kit (with CN3 connector)</td>
<td>D1-CK2</td>
<td>Incl. connectors for CN2, CN3, regenerative resistor, 24V control power and AC power</td>
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<tr>
<td>EMC Kit</td>
<td></td>
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<tr>
<td>EMC Kit (single phase)</td>
<td>D1-EMC1</td>
<td>Single-phase filter FN2090-10-06 and ferrite cores</td>
</tr>
<tr>
<td>EMC Kit (3 phase)</td>
<td>D1-EMC2</td>
<td>Three phase filter FN3258-7-45 and ferrite cores</td>
</tr>
<tr>
<td>EMC Kit (3 phase)</td>
<td>D1-EMC3</td>
<td>Three phase filter FN3258-7-45 (low leakage current) and ferrite cores</td>
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<tr>
<td>Regenerative resistors</td>
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<tr>
<td>Regenerative resistors</td>
<td>050100700001</td>
<td>Rated Power-100W, peak power-500W</td>
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<td>Heat sink</td>
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<tr>
<td>External heat sink</td>
<td>D1-H1</td>
<td>Standard</td>
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<tr>
<td>External heat sink</td>
<td>D1-H2</td>
<td>Low profile</td>
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<tr>
<td>Control cable</td>
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<tr>
<td>Control signal cable</td>
<td>LMACK30R</td>
<td>3m long, for connection to host controller. The signal cable has free leads at the controller side, so soldering can easily be done for connection with the host controller connector.</td>
</tr>
<tr>
<td>Control signal cable</td>
<td>LMACKA□□□A</td>
<td>For connection to ACS SPiiPlus SA controller</td>
</tr>
</tbody>
</table>
EMC Kit

Single phase filter (D1-EMC1)

Three phase filter (D1-EMC2)

Three phase filter (D1-EMC3)

Ferrite core
Regenerative resistors

Heat sink

External heat sink (D1-H1)

External heat sink (D1-H2)